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WARRANTY



User's Guide



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The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

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1. SAFETY INFORMATION

- ❑ Read the following safety information carefully before attempting to operate or service the meter.
- ❑ The meter analog input protection voltage range is $24V_{\overline{\sim}}$, current range is 250V/0.5A Fuse(MAX), maybe damage forever if overload.

Environment conditions :

- ① Altitude up to 2000 meters
- ② Indoor use
- ③ Relatively humidity 10~80%RH
- ④ Operation temperature $0 \sim 40^{\circ}\text{C}$ ($32\sim 104^{\circ}\text{F}$)

Maintenance & Clearing

- ① Repairs or servicing not covered in this manual should only be performed by qualified personnel.
- ② Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instruments.

Do not use abrasives or solvents on this instruments.

Safety symbols :



Meter is protected throughout by double insulation or reinforced insulation.



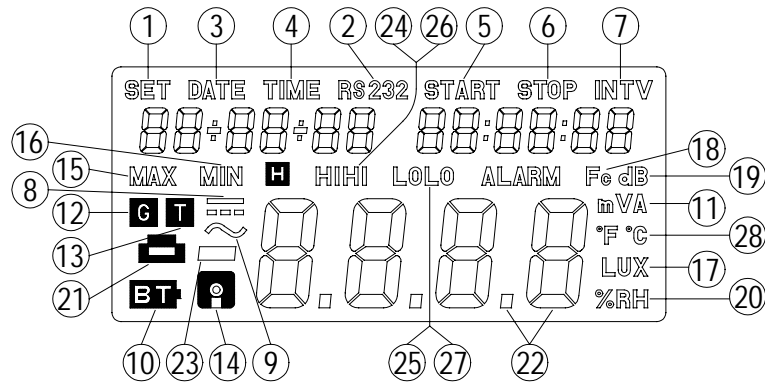
Comply with EN-61010-1

2. SPECIFICATION

2-1 General Specification












Display : 3 $\frac{1}{2}$ LCD

LCD symbols :



(Fig-1)

1. SET : In setting mode symbol.
2. RS-232 : In RS-232 transmission mode symbol.
3. DATE : Show the date of real time clock.
 : Show mode : month – day – year.
4. TIME : Show the time of real time clock.
 : Show mode is hour : minute : second.
5. START : Show the start time of record / print.
 : Show mode is hour : minute : second.

- STOP
6.  : Show the stop time of record / print.
- INTV
7.  : Show the interval time of record / print.
8.  : DC test symbol.
9.  : AC test symbol.
10.  : Low battery indicator.
11. mVA : Analog test indicate unit.
12.  : The printer working in the graphic mode.
13.  : The printer working in the text mode.
14.  : Memory record indicator.
15. MAX : MAX Analog input indicator.
16. MIN : MIN Analog input indicator.
17. LUX : LUX unit indicator.
18. Fc : Feet-candle unit indicator.
19. dB : dB unit indicator.
20. %RH : Relative Humidity %RH unit indicator.
21.  : Printer in using indicator.
22.  : 7 segments to show the read value and decimal point of LCD.
23.  : Negative polarity.

24. HI ALARM : Hi alarm indicator.
25. LO ALARM : Lo alarm indicator.
26. HiHi ALARM : Hi Hi alarm indicator.
27. LoLo ALARM : Lo Lo alarm indicator.
28. °C , °F : Temperature unit indicator.
29. Over Load Indicator : Show **OL** or - **OL** .

Other parts :

Input Protection : Voltage range $24V\overline{\sim}$, current range 0.5A/250V Fuse(MAX)

Operation Temperature : 0°C ~ 40°C (32°F ~ 104°F) & (10~ 80% RH)
and Humidity

Conserve Temperature : -10°C ~ 60°C (14°F ~ 140°F) & (10~70% RH)
and Humidity

Dimensions : About 250 (L) × 100 (W) × 45(H) mm

Weight : About 500g with battery

Printer : ①Interval print :
00 hour : 00 minute : 03 second ~ 23 hour :
59 minute : 59 sec

②Trigger print : Print three data
(date / time / Reading)

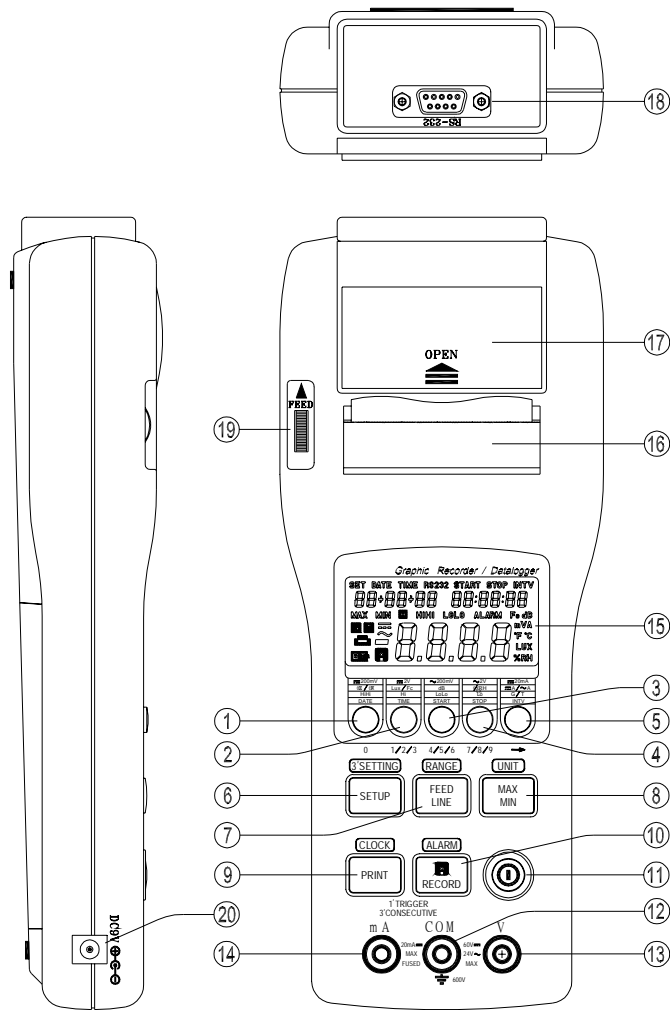
Accessories : Thermo carrying case, Test leads with alligator clip, 2 rolls of thermo paper, 110V/220V AC to 9V DC power adapter/power cord, RS-232 cable, P.C. software disk, 6pcs 1.5V AA batteries, TL-A37 analog output cable, RS-232 convert header, Operation manual.

2-2 Electrical Specification







Analog test range	: DCV/ACV : 2V , 200mV DCA : 20mA
Accuracy	: (at 23°C ±5°C , below 80%RH) DC→(±1%rdg+3dgts) AC→(±1%rdg+5dgts) at (50~450Hz)
Resolution	: 200mV/2V range is 0.1mV/1mV 20mA range is 0.01mA
A / D Sample Rate	: 2.5 times/sec
Power Source	: 6 pcs 1.5V , # 3 battery or 9V, DC adaptor (inside negative, outside positive)
Battery Life	: Approx. 100 hours (without printing)
Printer	: Thermal printer (EPL1902 of Panasonic)
MEMORY	: 60000 records (up to 130000 records)



3. PARTS & CONTROLS

3-1 The Name of Each Parts and Positions:



(Fig-2)

1.		Toggle button for ($\overline{\text{---}}$ 200mV, °C/°F, HiHi, DATA) and digit " 0 ".
2.		Toggle button for ($\overline{\text{---}}$ 2V, Lux/ Fc, Hi, TIME) and digit " 1/2/3 ".
3.		Toggle button for (\sim 200mV, dB, LoLo, START) and digit " 4/5/6 ".
4.		Toggle button for (\sim 2V, %RH, Lo, STOP) and digit " 7/8/9 ".
5.		Toggle button for ($\overline{\text{---}}$ 20mA, $\overline{\text{---}}$ A / \sim A, G / T, INTV) button and " \longrightarrow " right shift function.
6.		Press and hold this button for 3 sec will into setting mode, press again will end setting mode.


7.	<div>RANGE</div> <div>FEED LINE</div>	Feed paper in normal mode, range function in setting mode.
8.	<div>UNIT</div> <div>MAX MIN</div>	MAX/MIN function in normal mode " UNIT " function in setting mode.
9.	<div>CLOCK</div> <div>PRINT</div>	In normal mode, press 1 sec is trigger print function, press and hold for 3 sec is start/stop consecutive print function, but in setting mode will be " clock " function.
10.	<div>ALARM</div> <div>RECORD</div>	In normal mode, press 1 sec is trigger record (MAX 255 times), In setting mode is " alarm " function, press and hold over 3 sec is start/stop consecutive record function.
11.		Power button.
12	" COM " Measuring Socket	To connect negative lead of voltage, current. (black color)
13	" V " Measuring Socket	To connect positive lead for voltage.(red color)
14	" mA " Measuring Socket	To connect positive lead for current.
15	LCD	Show test value, unit symbol and range indicator.
16	Thermal Printer	Printing data.
17	Acryl	Putting thermal paper.
18	RS-232 Connector	RS-232 used.
19	FEED Button	Feed paper into printer
20	DC 9V Socket	To connect adaptor.

3-2 Power Status :


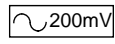

As battery power is not sufficient, the **BT** , will be shown on LCD replace with six new 1.5V batteries is required.

3-3 Quick Manual for Easy Set-up

STEP1	STEP2	STEP3	STEP4	STEP5
Push this button 3 second.	Select one.	Choose one from specified function Bar.	Reconfirm input setting.	Press to return normal.
<div>SETUP</div>	<div>RANGE</div> <div>UNIT</div> <div>CLOCK</div> <div>ALARM</div>	<div> <div>200mV</div> <div>2V</div> <div>200mV</div> <div>2V</div> <div>20mA</div> </div> <div> <div>°C / °F</div> <div>LUX / FC</div> <div>dB</div> <div>%RH</div> <div>mA / A</div> </div> <div> <div>DATE</div> <div>TIME</div> <div>START</div> <div>STOP</div> <div>INTV</div> </div> <div> <div>HiHi</div> <div>Hi</div> <div>LoLo</div> <div>Lo</div> <div>G / T</div> </div>	<div>RANGE</div> <div>UNIT</div> <div>CLOCK</div> <div>ALARM</div>	<div>SETUP</div>

- You could only set up one of the functions at each time.
- To change position of point decimal, follow step1 & step2, then press  button.
- To input digit, follow step1 & step3 to set the number.

3-4 ACV 、DCV and DCA Test Setting :

- ACV 2V Test setting sequence : Press and hold **3SETTING** for 3 sec → press **RANGE** → press  → press **RANGE** → press **3SETTING** , to end setting mode.
- ACV 200mV Test setting sequence : Press and hold **3SETTING** for 3 sec → press **RANGE** → press  → press **RANGE** → press **3SETTING** , to end setting mode.
- DCV 2V Test setting sequence : Press and hold **3SETTING** for 3 sec → press **RANGE** → press  → press **RANGE** → press **3SETTING** , to end setting mode.

4. DCV 200mV Test setting sequence : Press and hold **3SETTING** for 3 sec → press **RANGE** → press **200mV** → press **RANGE** → press **3SETTING**, to end setting mode.
5. DCA 20mA Test setting sequence : Press and hold **3SETTING** for 3 sec → press **RANGE** → press **20mA** → press **RANGE** → press **3SETTING**, to end setting mode.

3-5 UNIT Setting Step :

1. °C/°F Setting step : press and hold **3SETTING** for 3 sec → press **UNIT** → press **°C/°F** change °C/°F → press **UNIT** → press **3SETTING**, to end setting mode.
2. Lux/Fc Setting step : press and hold **3SETTING** for 3 sec → press **UNIT** → press **Lux/Fc** change Luc/Fc → press **UNIT** → press **3SETTING**, to end setting mode.
3. dB Setting step : press and hold **3SETTING** for 3 sec → press **UNIT** → press **dB** → press **UNIT** → press **3SETTING**, to end setting mode.
4. %RH Setting step : press and hold **3SETTING** for 3 sec → press **UNIT** → press **%RH** → press **UNIT** → press **3SETTING**, to end setting mode.
5. $\overline{\sim}$ A Setting step : press and hold **3SETTING** for 3 sec → press **UNIT** → press change $\overline{\sim}$ A/ \sim A → press **UNIT** → press **3SETTING**, to end setting mode.

3-6 ALARM Setting Step :

1. HIHI ALARM Setting step : press and hold **3SETTING** for 3 sec → press **ALARM** → press **HiHi** → assort 0~9 number → right shift button setting "ALARM" → press **ALARM** → press **3SETTING**, to end setting mode.
2. HI ALARM Setting step : press and hold **3SETTING** for 3 sec into setting mode → press **ALARM** → press **Hi** → assort 0~9 number


- ➔ right shift button setting "ALARM" ➔ press **ALARM** ➔ press **3'SETTING**, to end setting mode.
3. LOLO ALARM Setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **ALARM** ➔ press **LoLo** ➔ assort 0~9 number ➔ right shift button setting "ALARM" ➔ press **ALARM** ➔ press **3'SETTING**, to end setting mode.
 4. LO ALARM Setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **ALARM** ➔ press **Lo** ➔ assort 0~9 number ➔ right shift button setting "ALARM" ➔ press **ALARM** ➔ press **3'SETTING**, to end setting mode.

3-7 Real Time Clock , Time/ Date Setting Step :





1. Real time clock , date setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **CLOCK** ➔ press **DATE** ➔ assort 0~9number ➔ right shift button setting date ➔ press **CLOCK** ➔ press **3'SETTING**, to end setting mode.
2. Real time clock, time setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **CLOCK** ➔ press **TIME** ➔ assort 0~9number ➔ right shift button setting time ➔ press **CLOCK** ➔ press **3'SETTING**, to end setting mode.

3-8 Record/Print Start Time, Stop Time, Interval Time Setting Step:



1. Start time setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **CLOCK** ➔ press **START** ➔ assort 0~9 number ➔ right shift button setting start time ➔ press **CLOCK** ➔ press **3'SETTING** to end setting mode.
2. Stop time setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **CLOCK** ➔ press **STOP** ➔ assort 0~9number ➔ right shift button setting stop time ➔ press **CLOCK** ➔ press **3'SETTING** to end setting mode.
3. Interval time setting step : press and hold **3'SETTING** for 3 sec into setting mode ➔ press **CLOCK** ➔ press **INTV** ➔ assort 0~9 number ➔ right shift button setting interval time ➔ press **CLOCK** ➔

press  to end setting mode.

3-9 Print Mode Setting Step :







Printer work mode setting sequence : press and hold  for 3 sec into setting mode → press  → press  change G/T MODE → press , to end setting mode.

3-10 Clear Record Step :




Press  +  Power ON in the same time

The LCD should display “dEL”






3-11 Disable Start 、 Stop 、 Intv and Setting Step :


1. Disable START 、 STOP 、 INTV sequence : press and hold  for 3 sec into setting mode → press  disable start, stop, intv → press  to end setting mode.
2. Disable ALARM sequence : press and hold  for 3 sec into setting mode → press  disable alarm → press  to end setting mode.

3-12 Decimal Point Setting Step :

Shift point setting sequence : press and hold  for 3 sec to enter setting mode → press  to change decimal point position → press  to end setting mode.

3-13 Consecutive Record and Print Setting Step :

Setting sequence : press and hold  for 3 sec to enter setting mode → press  setting  /  → press , to end setting mode.









※ If already in setting MODE, press  button only.

3-14 Reset System Setting Step :





Press  +  Power ON

3-15 Record / Print Start and Step Operation Method :

(1). Start way :

1. Trigger Record / Print : in general mode press  or  one second.
2. Consecutive Record/Print :
 - ① Automatic mode :
 - a). Into setting mode, setting Start/Stop/Intv/Time.
 - b). Chose automate consecutive Record/Print (by 3-13 setting way)
 - c). Back to general mode, on LCD  or  should be repeat.
 - ② Hand setting mode :
 - a). Into setting mode, disable Start, Stop, Intv. (by 3-11 stop way)
 - b). Into setting mode, setting Intv.
 - c). Back to general mode.
 - d). Press   button 3 second, the LCD will be show  or  symbol, into consecutive Record / Print of hand setting mode.

(2). End Record/Print :

1. Automatic mode : The function will be stopped automatically while the STOP time is up.
2. Hand setting mode : To stop consecutive Record/Print by user press and hold  or  button for 3 seconds. The LCD  or  symbol will be disappear.

3-16 Memory Full Warning :

The  symbol will be flash.

3-17 Alarm Print in Graphic Mode :

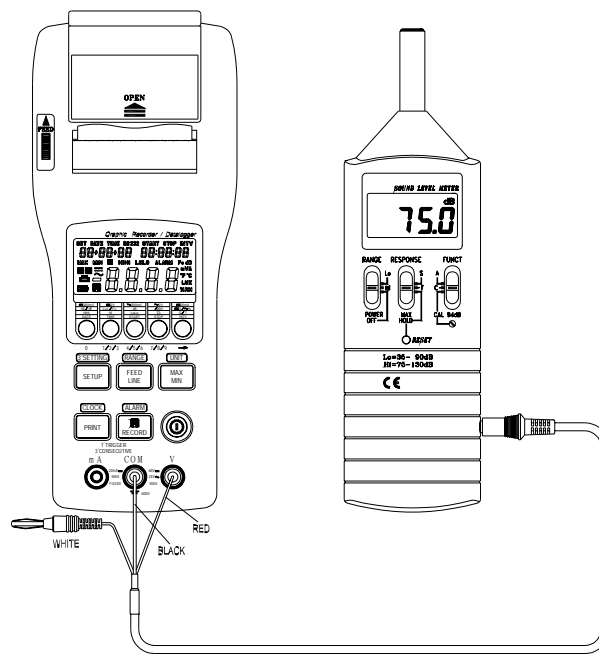
When printing in G mode, if you have setting any alarm points (HiHi, Hi, LoLo, Lo) when the read value over the set points, the printer will print alarm value on the paper.

3-18 Scale Change in Graphic Mode

HiHi ALARM	Hi ALARM	Lo ALARM	LoLo ALARM	Scale change by alarm setting
✓				No change
	✓			No change
		✓		No change
			✓	No change
✓	✓			Change scale by HiHi Hi ALARM
✓		✓		Change scale by HiHi Lo ALARM
✓			✓	Change scale by HiHi LoLo ALARM
	✓	✓		Change scale by Hi Lo ALARM
	✓		✓	Change scale by Hi LoLo ALARM
		✓	✓	Change scale by Lo LoLo ALARM
✓	✓	✓		Change scale by HiHi Lo ALARM
✓	✓		✓	Change scale by HiHi LoLo ALARM
✓		✓	✓	Change scale by HiHi LoLo ALARM
	✓	✓	✓	Change scale by Hi LoLo ALARM
✓	✓	✓	✓	Change scale by HiHi Lo ALARM
				No setting ALARM, no change

✓ : had setting

3-19 How to Connect TL-(A37) Analog Output Cable



Model	Connecting way (DC Input)	Connecting way (AC Input)	Remark
TES-1300	Red lead connect to (V), Black lead connect to (COM)	No (AC input)	
TES-1302	Red lead connect to (V), Black lead connect to (COM)	No (AC input)	
TES-1303	Red lead connect to (V), Black lead connect to (COM)	No (AC input)	
TES-1332	Red lead connect to (V), Black lead connect to (COM)	No (AC input)	
TES-1334	Red lead connect to (V), Black lead connect to (COM)	No (AC input)	
TES-1350	Red lead connect to (V), Black lead connect to (COM)	White lead connect to (V), Black lead connect to (COM)	AC,DC output terminal same
TES-1351	Red lead connect to (V), Black lead connect to (COM)	White lead connect to (V), Black lead connect to (COM)	AC,DC output terminal same
TES-1352	White lead connect to (V), Black lead connect to (COM)	White lead connect to (V), Black lead connect to (COM)	AC,DC output terminal difference
TES-1353	White lead connect to (V), Black lead connect to (COM)	White lead connect to (V), Black lead connect to (COM)	AC,DC output terminal difference
TES-1360	Red lead connect to (V), Black lead connect to (COM)	White lead connect to (V), Black lead connect to (COM)	


3-20 Setup Process Transducer (4-20mA) Mode :

Operation way :

Press **INTV** + **I** Power ON into Process Transducer (4 - 20 mA) mode.

First of all, setting Ref1 "MAX" reference value (the "MAX" symbol will be flash),

then press     **button to input "MAX" reference**

0.001 ~ 9999, press  button and wait for speaker sound. Then the process transducer (4 - 20mA) mode setting is success.

"LCD" display value: $\frac{\text{Ref1} - 0}{16} \times (\text{A/D Reading} - 4) = \text{"LCD" display value}$
※ Available for (4mA ~ 20mA) transducer only.

4. BATTERY & FUSE REPLACEMENT

4-1 Battery Check & Replacement :

1. As battery power is not sufficient, the **BT**, will be shown on LCD replace with six new 1.5V batteries is required.
2. a). Disconnecting test leads.
b). Turning off multimeter with screw-driver.
c). Open battery cover.
d). Replace the batteries
e). Cover and secure the battery cover.

4-2 Fuse Replacement :

- a). Disconnecting test leads.
 - b). Turn off multimeter.
 - c). Open fuse cover with screw-driver.
 - d). Remove old fuse and replace with new fuse.
 - e). Cover and secure the fuse cover.
- ※ Only 5 ϕ \times 20mm fast blow type fuse is allowable.

4-3 Note :

To prevent electrical hazard or shock, turn off multimeter and disconnect test leads before removing any cover.

5. DATALOGGING

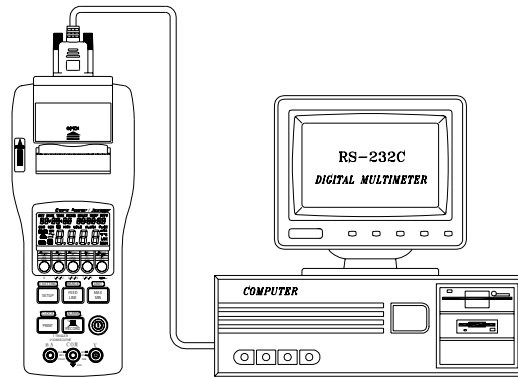
5-1 Software Installation :

1. PC Hardware requirements :

- ☐ HDD 20 MB space, 1.44MB floppy driver, serial ports, 486 PC or above, with COM1, COM2 comports.
- ☐ EGA or higher display.
- ☐ 4M bytes or more memory size.

2. Hardware installation :

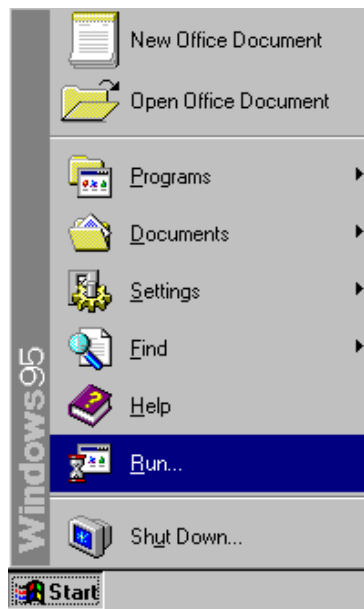
- ① Switch off all power related to your PC.
- ② Connect the female socket of RS-232 cable to PC's COM1 or COM2.



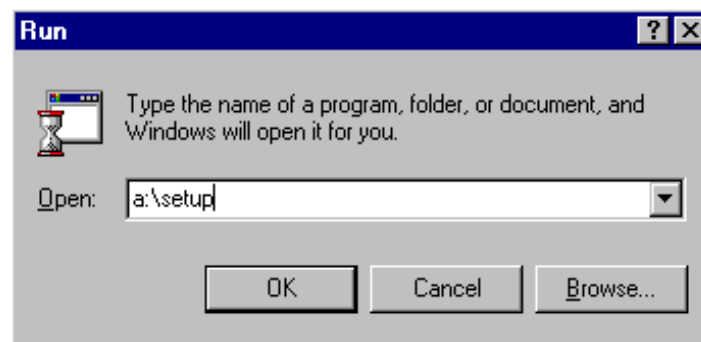
- ③ Power on.
- ④ Connect the male socket of RS-232 cable to Graphic Recorder.

3. Software setup :

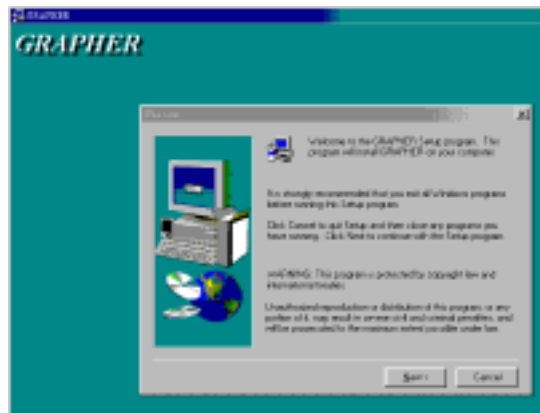
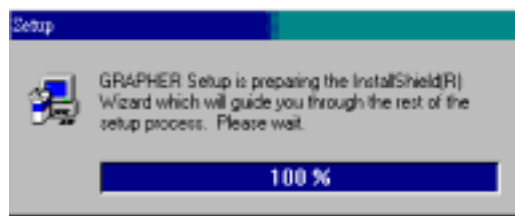
- ① Before setting up software of Graphic Recorder start up windows 95/98 operating system.
- ② Close all application.
- ③ Insert the installation diskette into drive A: or drive B:.
- ④ Click " Start " from Start menu, move mouse pointer to " Run ", then click this button.



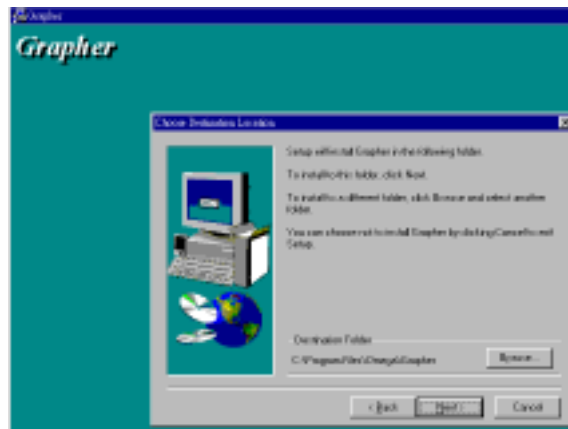
⑤ A "Run" window appears, then type A:\SETUP or B:\SETUP and press "OK".



⑥ Setup program will run automatically.

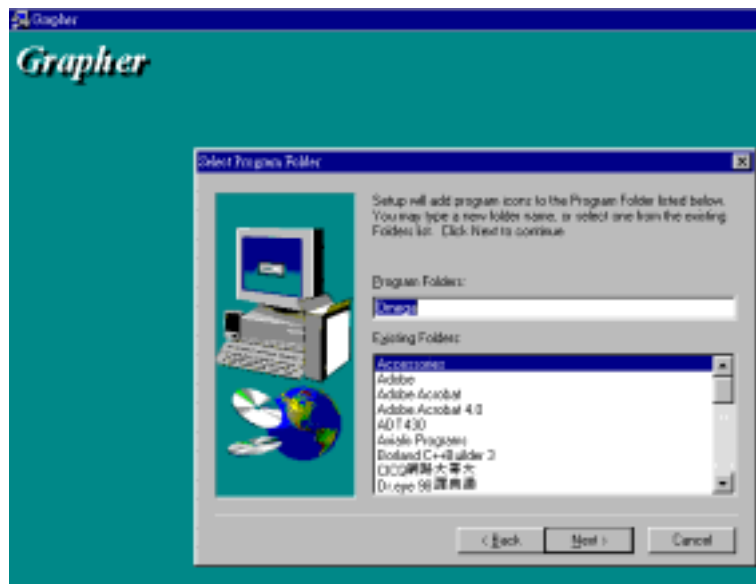


⑦ Click "NEXT"



⑧

- a). Click " NEXT " or
- b). If willing to set up on a different folder, click " Browse ".



⑨ Click "NEXT"

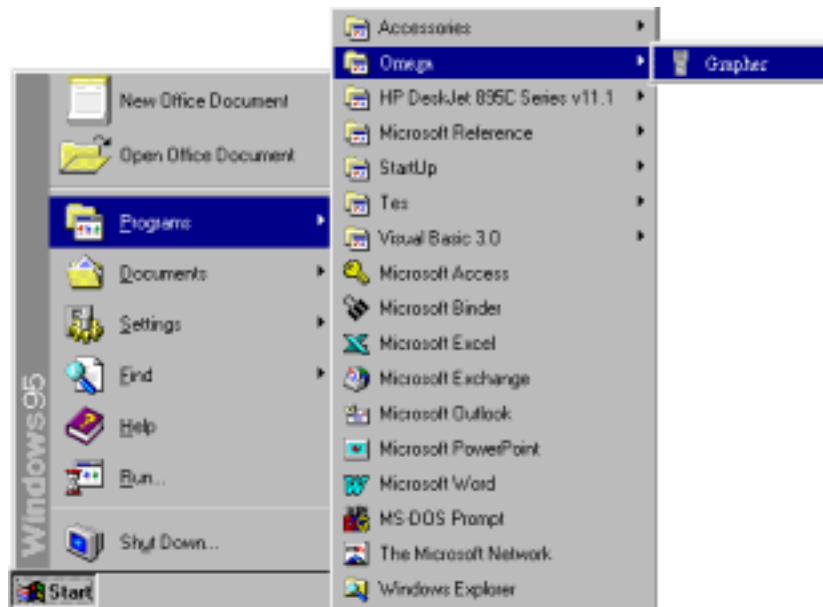


5-2 Default Settings :

1. Start up

① Run the Graphic Recorder software :

Click "Start" from the "Start" menu, move mouse pointer to "Programs" and then move to "Omega" (Default Settings). Move mouse pointer to "GRAPHER" and then click this button.



② Move mouse pointer to available comport COM1, COM2 then click.



2. RS232 settings

- | | |
|--------------------|-----------------|
| ① Baud rate : 9600 | ② Parity : None |
| ③ Data bits : 8 | ④ Stop bit : 1 |

3. Time Setup : Move mouse pointer to "System Time Set" then click this button to input time of PC to the Graphic Recorder.

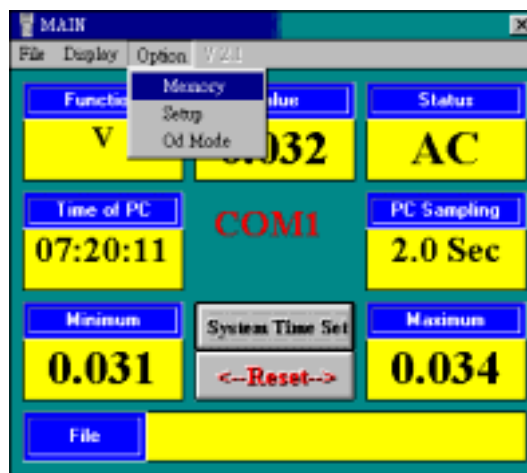


When "WAIT" (center) disappeared, setup of time is completed.

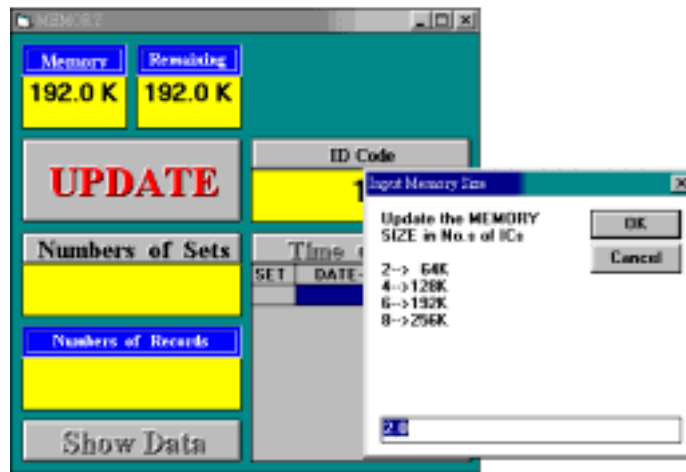
Also could be set up by "Setup" mode. Refer to P.31 ② for more details.

4. Memory size : If you have bought more memories :

- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Memory" and then click this button.

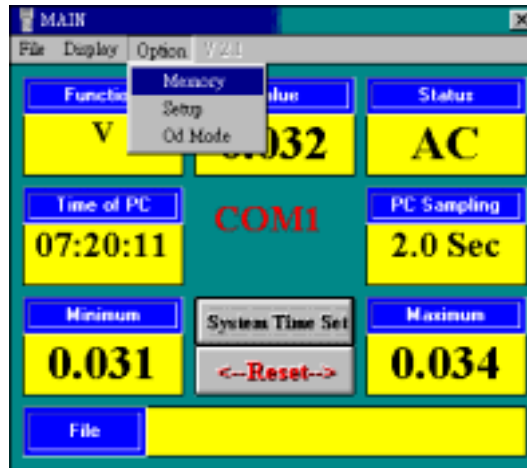


- ② In the window "MEMORY", move mouse pointer to "UPDATE" and then click this button. Input the No.s of IC, and then press OK.

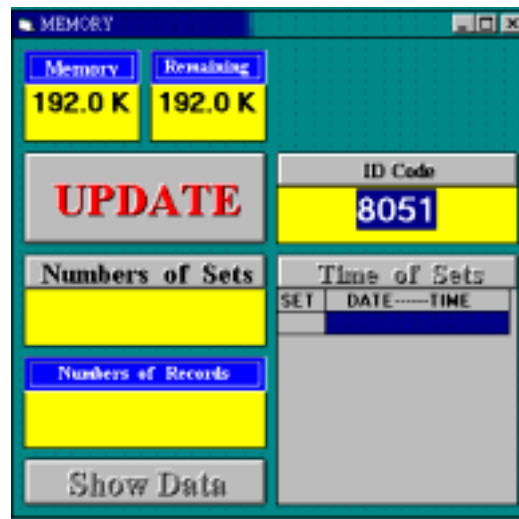


5. ID CODE Setup :

- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Memory" and then click this button.



- ② In the window of "MEMORY", double click or drag the mouse to highlight the values of "ID Code".



The screenshot shows a window titled "MEMORY". At the top, there are two buttons: "Memory" and "Remaining", both showing "192.0 K". Below these is a large red "UPDATE" button. To the right of the "UPDATE" button is a field labeled "ID Code" containing the value "8051". Below the "UPDATE" button are two more buttons: "Numbers of Sets" and "Numbers of Records", both showing empty yellow boxes. At the bottom left is a "Show Data" button. On the right side, there is a section titled "Time of Sets" with a table below it. The table has two columns: "SET" and "DATE-----TIME". The "SET" column has a single row with a blue header. The "DATE-----TIME" column is empty.

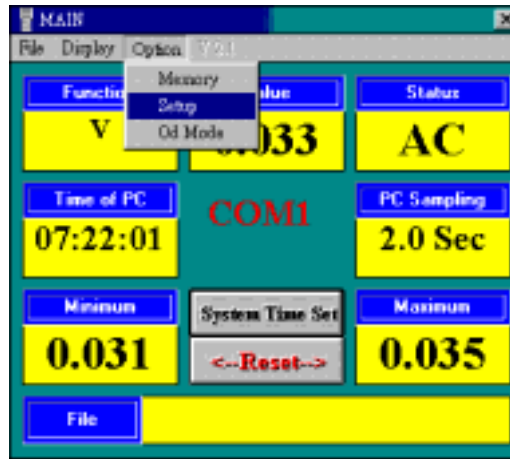
- ③ Input the expected values of "ID Code" and then click the button "ID Code".



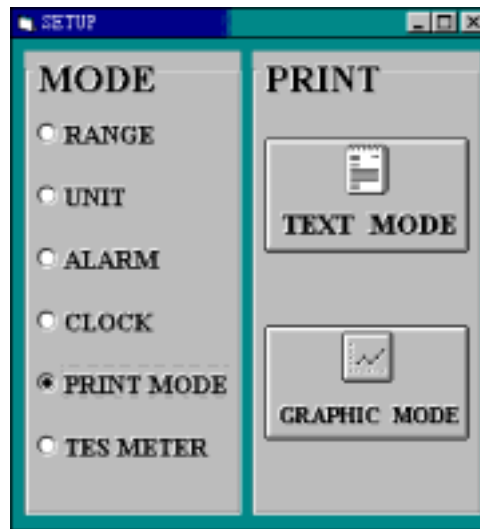
The screenshot shows the same "MEMORY" window. The "ID Code" field now contains the value "30". The "PLEASE WAIT...." text is visible in the top right corner. The "UPDATE" button is still present. The "Numbers of Sets" and "Numbers of Records" buttons are still empty. The "Show Data" button is still at the bottom left. The "Time of Sets" section and its table are still on the right.

- ④ While "PLEASE WAIT" disappeared, setup of "ID Code" is completed.

6. Setup of sampling rate of the meter :



① Move mouse pointer to "Option" then click. Move mouse to "Setup" and then click this button.



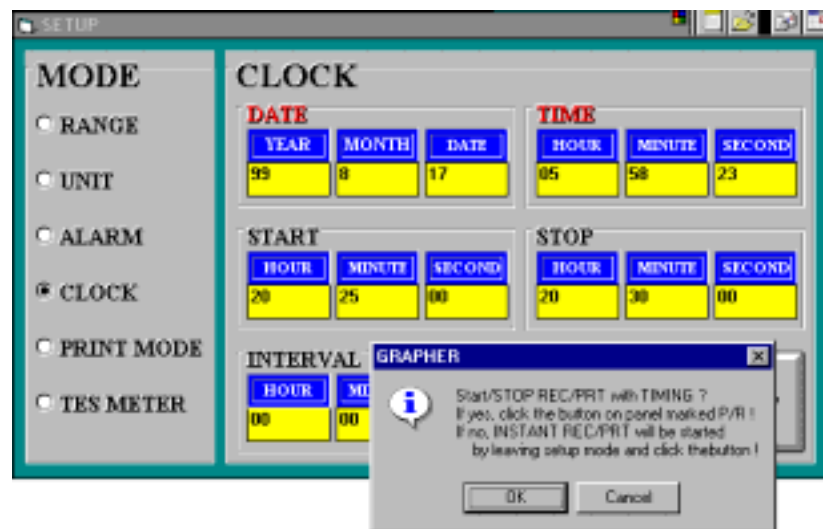
- ② In the window "SETUP", select the option button named "CLOCK" under the title "MODE".

The screenshot shows a software window titled "SETUP". On the left, under the "MODE" heading, there are six radio buttons: "RANGE", "UNIT", "ALARM", "CLOCK" (which is selected), "PRINT MODE", and "TES METER". The main area of the window is titled "CLOCK" and contains several input fields for time and date. The "DATE" section has fields for "YEAR" (99), "MONTH" (00), and "DATE" (17). The "TIME" section has fields for "HOUR" (23), "MINUTE" (55), and "SECOND" (42). Below these are "START" and "STOP" sections, each with "HOUR", "MINUTE", and "SECOND" fields. The "START" values are 20, 25, and 00 respectively. The "STOP" values are 20, 14, and 00 respectively. At the bottom, there is an "INTERVAL" section with "HOUR", "MINUTE", and "SECOND" fields, with values 00, 00, and 05. To the right of the "INTERVAL" fields are two buttons: "TIME SET" and "SETUP".

- ③ Drag mouse to highlight the values of "INTERVAL".

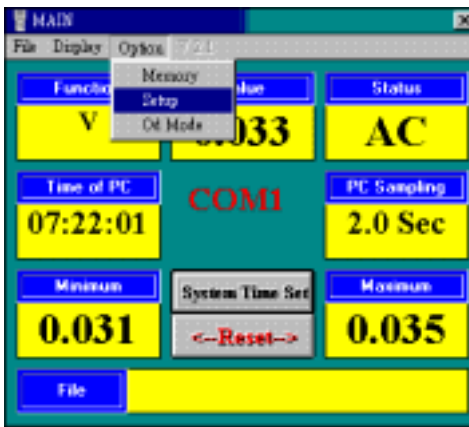
This screenshot is identical to the previous one, showing the "SETUP" window with the "CLOCK" mode selected. The "INTERVAL" section at the bottom shows values of 00 for hours, 00 for minutes, and 05 for seconds. In this image, the "05" in the "SECOND" field of the "INTERVAL" section is highlighted with a mouse cursor.

- ④ Input the expected values with "HOUR" , "MINUTE" , "SECOND" of "INTERVAL" then click "SETUP".
- ⑤ While the message "Start/Stop REC/PRT with timing ? " appears, press "Cancel" at this moment then escape Setup mode.

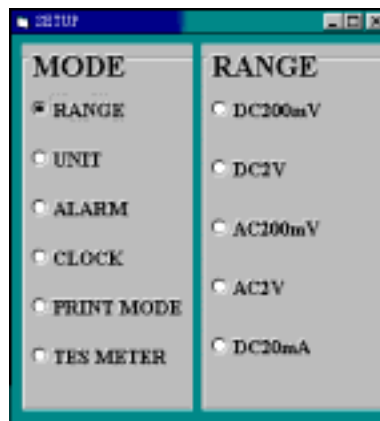


7. Setup of Input Voltage \ Current

- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Setup" and click this button.

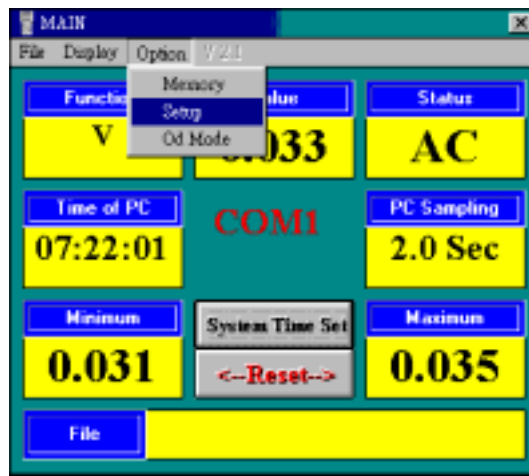


- ② In the window "SETUP", select the option button named "RANGE" under the title "MODE". Under the "RANGE" title, select the expected input Voltage \ Current then escape "SETUP" mode.

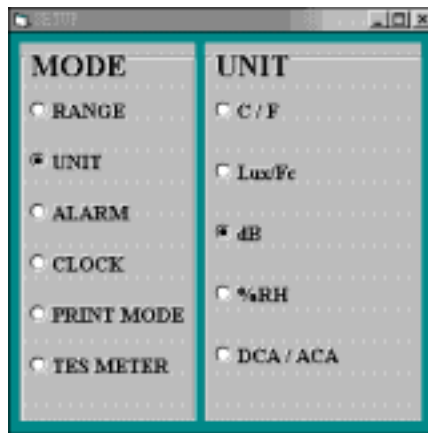


8. Setup of Unit

- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Setup" and click this button.

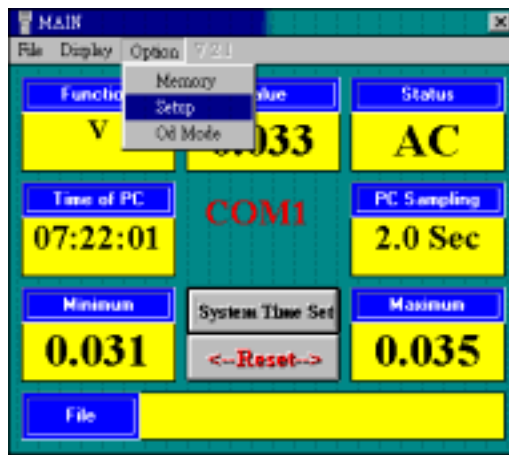


- ② In the window "SETUP", select the option button named "UNIT" under the title "MODE". Under the "UNIT" title, select the expected input unit then escape "SETUP" mode.

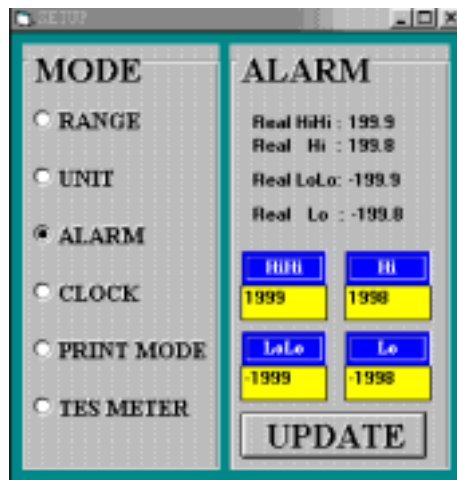


9. Setup of Alarm :

- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Setup" and click this button.



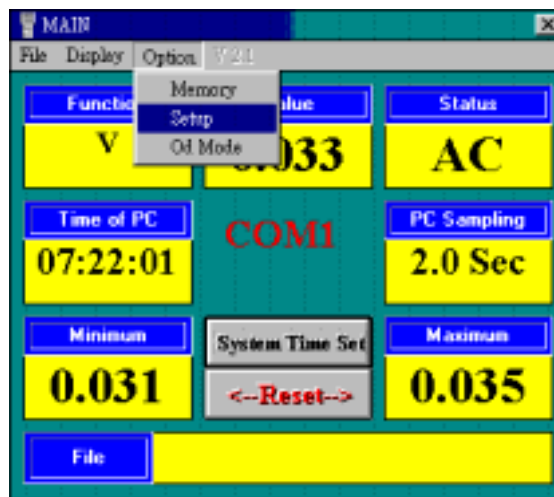
- ② In the window "SETUP", select the option button named "ALARM" under the title "MODE". Under the "ALARM" title, drag mouse to highlight the values of HiHi, Hi, Lo, LoLo. Input the expected values then move mouse pointer to "UPDATE" and click. Escape the "SETUP" window to complete.



10. Setup of Record / Print / Time : (Open up "PANEL" window is required)

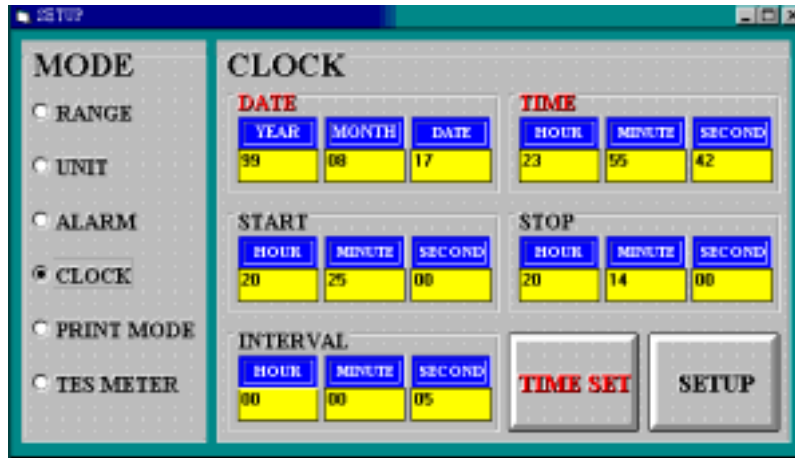


① Move mouse pointer to "Option" then click. Move mouse pointer to "Setup" and click this button.



② In the window "SETUP", select the option button named "CLOCK" under

the title "MODE". Under the "CLOCK" title.

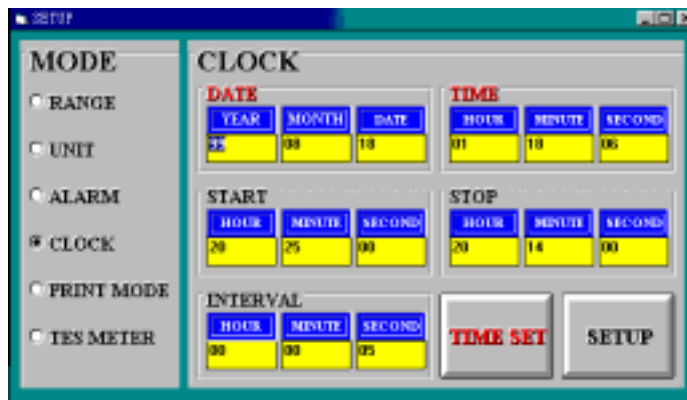


A. Setup time of the meter manually :

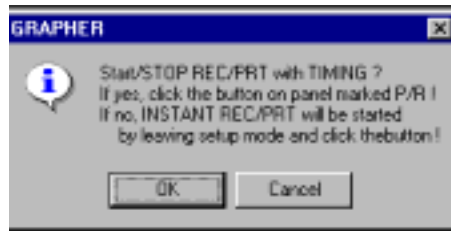
- a). Move mouse pointer to "TIME SET" then click. While the warning message appears, click "OK".



- b). Drag mouse to highlight the values of YEAR / MONTH / DATE / HOUR / MINUTE / SECOND under the red title "DATE" or "TIME".



- c). Input the expected values and then click the right bottom button "SETUP".



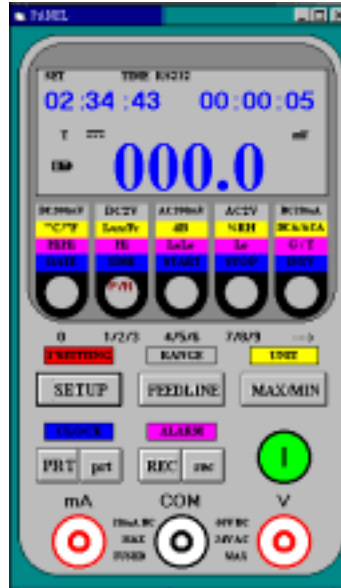
- d). While the "START/STOP REC/PRT with timing....." appears, click "Cancel" and then escape the "SETUP" mode.

B. Setup time of REC/PRT automatically

- Drag mouse to highlight the values of HOUR \ MINUTE \ SECOND under the title "START" then input the expected values.
- Drag mouse to highlight the values of HOUR \ MINUTE \ SECOND under the title "STOP" then input the expected values.
- Drag mouse to highlight the values of HOUR \ MINUTE \ SECOND under the title "INTERVAL" then input the expected values.
- Move mouse pointer to "SETUP" located at right bottom then click this button.



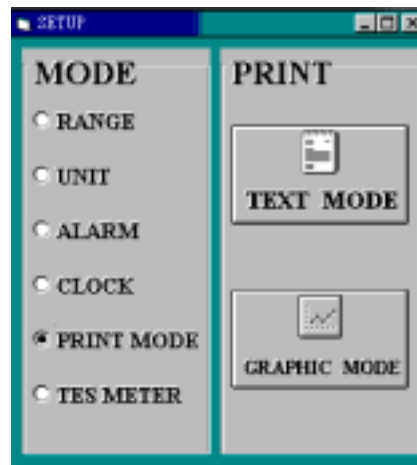
- e). While the "START/STOP REC/PRT with timing....." appears, click "OK".



- f). While the P / R signal appears (in the window of "PANEL"), move mouse pointer to this signal and then click to set up the Start / Stop time of record / print.
11. Setup the print mode of the meter :
- ① Move mouse pointer to "Option" then click. Move mouse pointer to "Setup" and click this button.



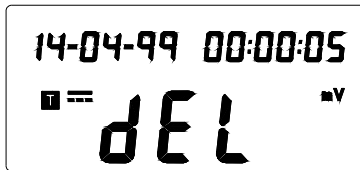
- ② In the window "SETUP" select the option button named "PRINT MODE" under the title "MODE".



- ③ Under the "PRINT" title, select a print mode and then click that button. Escape "SETUP" mode to complete.

5-3 Meter Stand alone Operation :

1. How to clear " Data Logger "





⇒ Press " RECORD " + " POWER ON ", the LCD will be show "dEL".

⇒ After " POWER ON ", release " RECORD ", button.

2. How to do trigger record





⇒ Press " RECORD " button 1 second, the LCD  or  will be display.

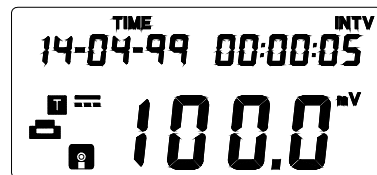


⇒ Release " RECORD " button the LCD  or  symbol will be clear.

3. How to consecutive Record/Print (I)



⇒ Press and hold " RECORD " or " PRINT " button approximate 3 second, the  or  symbol will be display.







⇒ Release " RECORD " or " PRINT " button, the LCD  or  symbol will be disappear.

4. How to set consecutive Record/Print (II)







⇒ Press " SETUP " button
approximate 3 second, the LCD
should show " SET " symbol.

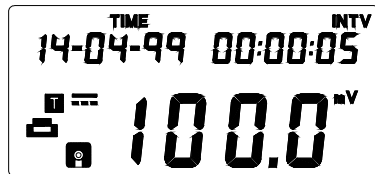


⇒ Repeat press  Button, choose
Print/Record/Print, Record function,
the LCD will show   





⇒ Press " SETUP " button, back to
general mode, the " SET " symbol
will be clear and shows  
  by choice LCD.

5. How to stop consecutive Record/Print (I)

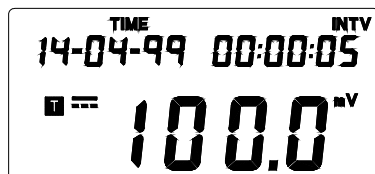


⇒ Press and hold " RECORD " or "
PRINT " button for 3 seconds to
stop function.



⇒ Stop consecutive Record/Print
function the LCD  or  will be
clear.

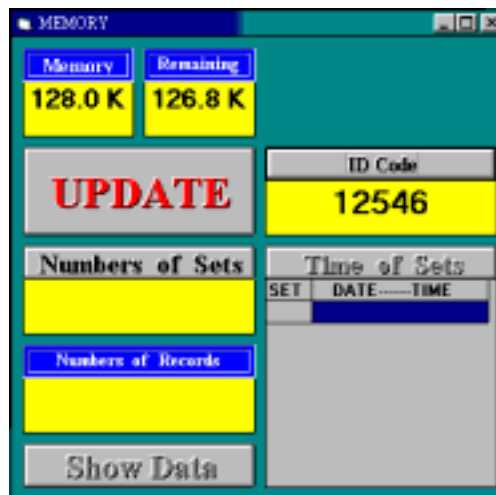
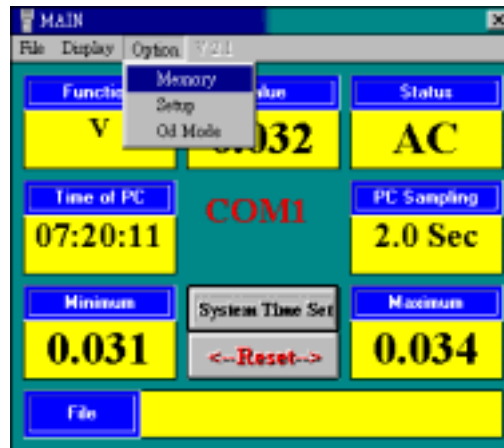
6. How stop consecutive Record/Print (II)



⇒ If the " START " and " STOP "
function have been set, the printer
will be stopped when "STOP" time
is up.

5-4 Download Datalogger (Graphic Recorder →PC)

Move mouse pointer to “Option” then click. Move mouse pointer to “Memory” and then click this button to read recorded data in memory.



As above, the total memory size is 128K, 126.8K remained.

1. Move mouse pointer to "Numbers of Sets" then click this button to show how many sets have been recorded in the memory of Graphic Recorder (EEPROM).

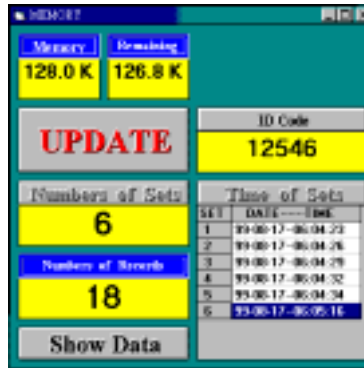
The screenshot shows a window titled "MEMORY" with a teal background. At the top left, there are two yellow boxes: "Memory" with "128.0 K" and "Remaining" with "126.8 K". Below these is a large red "UPDATE" button. To the right of "UPDATE" is a yellow box labeled "ID Code" with the value "12546". Below "UPDATE" is a yellow box labeled "Numbers of Sets" with the value "6". To the right of this is a section titled "Time of Sets" containing a table with headers "SET", "DATE", and "TIME". Below the "Numbers of Sets" box is a yellow box labeled "Numbers of Records" and a "Show Data" button at the bottom left.

2. Move mouse pointer to "Time of Sets" then click this button.
There will be a list that shows the recording time of each set.

The screenshot shows the same "MEMORY" window, but now the "Time of Sets" table is populated with data. The text "6 SETS COMPLETED" is displayed above the table. The table has three columns: "SET", "DATE", and "TIME". The rows are numbered 1 through 6, and the date for all rows is "99-08-17". The time for each set is shown in the "TIME" column. The row for SET 6 is highlighted in blue.

SET	DATE	TIME
1	99-08-17	06:04:23
2	99-08-17	06:04:26
3	99-08-17	06:04:29
4	99-08-17	06:04:32
5	99-08-17	06:04:34
6	99-08-17	06:05:16

3. Move mouse pointer to the list and choose a set then click. The number of records for this set will be shown.



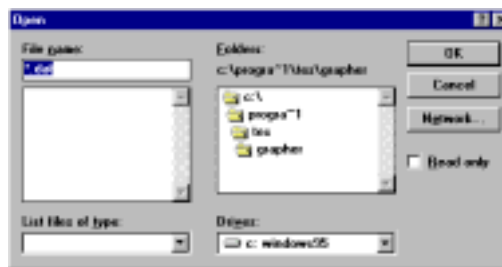
4. For more details of the chosen set, move mouse pointer to "Show Data" and then click.

The 'REC_L07' window displays a table titled "18 RECORDS IN NO. 6 SET". The table has 7 columns: Row, Date, Time, Value, Function, Status, and Bat. The data is as follows:

Row	Date	Time	Value	Function	Status	Bat
6	99-08-17	06:05:36	0	mV	DC	Low
7	99-08-17	06:05:41	0	mV	DC	Low
8	99-08-17	06:05:46	0	mV	DC	Low
9	99-08-17	06:05:51	0	mV	DC	Low
10	99-08-17	06:05:56	0	mV	DC	Low
11	99-08-17	06:06:01	0	mV	DC	Low
12	99-08-17	06:06:06	0	mV	DC	Low
13	99-08-17	06:06:11	0	mV	DC	Low
14	99-08-17	06:06:16	0	mV	DC	Low
15	99-08-17	06:06:21	0	mV	DC	Low
16	99-08-17	06:06:26	0	mV	DC	Low
17	99-08-17	06:06:31	0	mV	DC	Low
18	99-08-17	06:06:36	0	mV	DC	Low

SAVE : To save data recorded in HD and to apply for other applications such as EXCEL, WORD. For example, P.42

- a). Move mouse pointer to "SAVE" then click this button.
- b). There comes up a dialog box. Input the name of the file if willing to save as.
- c). Click "OK"



5-5 Data Conversion

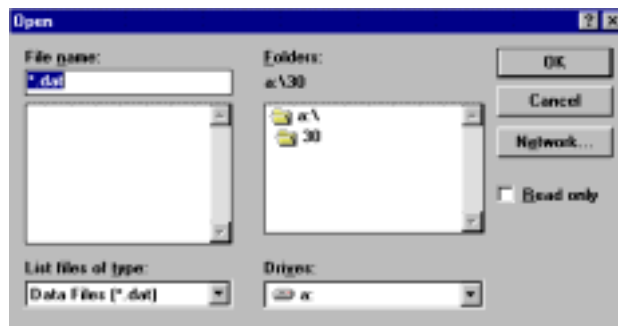
1. Save data by RS-232 communication port in PC.

- ① Open Graphic Recorder software, check if Graphic Recorder connected and PC is well. If not the " NO COM " signal will be displayed, please be sure RS-232 cable is plugged and secured to COM1 or COM2. After a good connection, the COM1 or COM2 symbol will be showed on the screen.

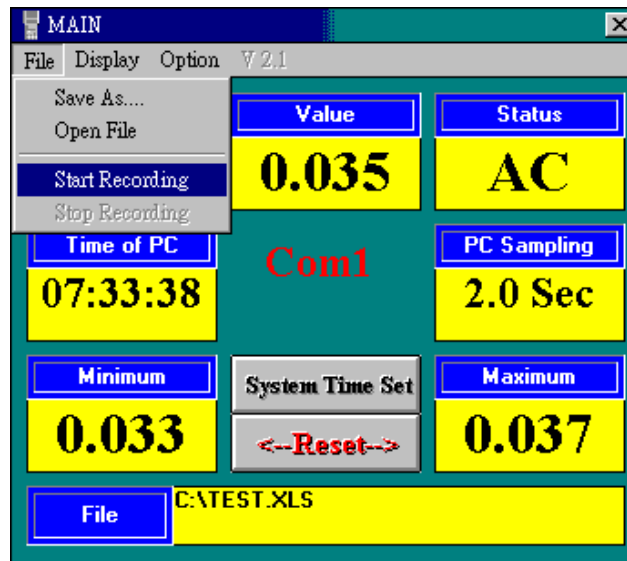


- ② Move mouse pointer to "File", then click. Move mouse pointer to "SAVE AS" then click this button. You can find the " open file " dialog box, please change to new file name : *.xls from original file *.dat then press enter. For example : test.xls





- ③ Move mouse pointer to "File", then click. And move mouse pointer to "START RECORDING ", then click this button. The "RECORDING" signal and No.s of PC record will display from 1 up to end.

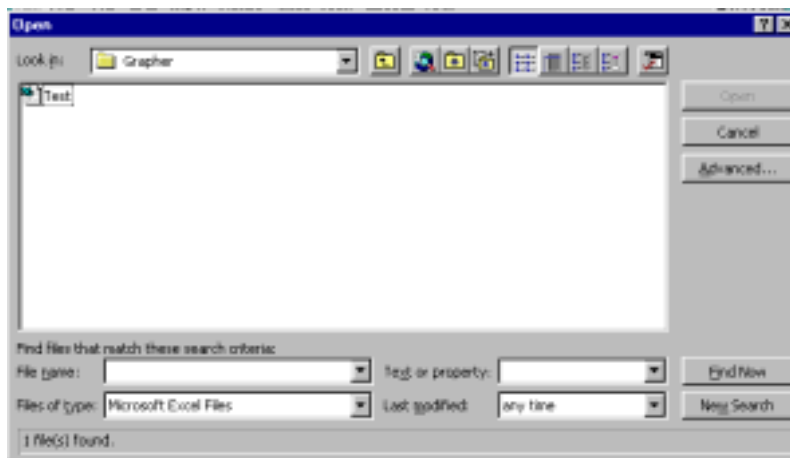


- ④ To end this record function, move mouse pointer to "File", then click. Move mouse pointer to " STOP RECORDING ", click the button. The " RECORDING " signal will disappear.

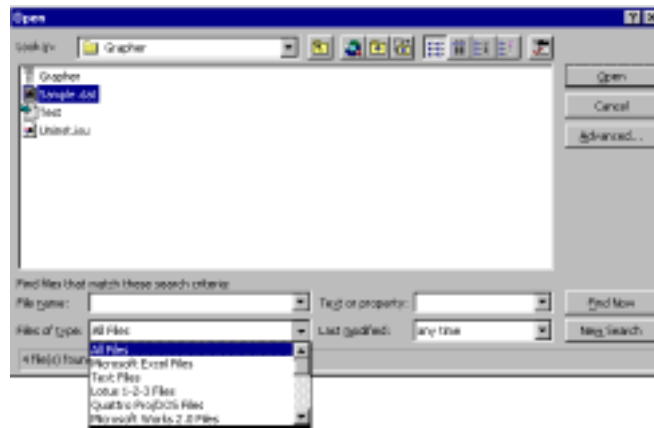


2. Apply for Excel : Open Microsoft EXCEL, go to "open file ", from the searching function.

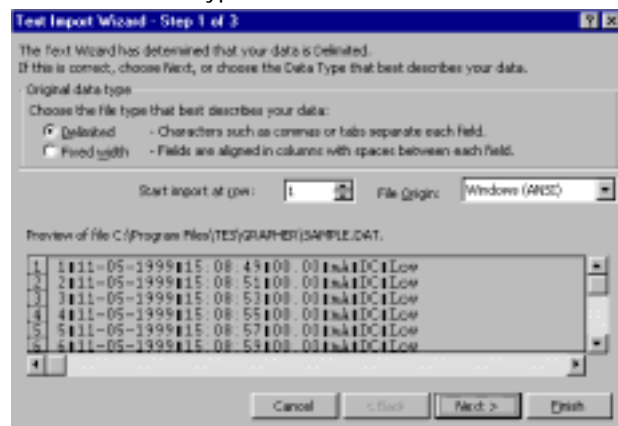
- ① Find the EXCEL type. For example, test.xls. Select test.xls then click "open" button.



- ② From the "Files of type", click the pull down pointer, then choose "All Files", select sample.dat then click "open" button.



- ③ The "Text Import Wizard" then appears, click finish button, the selected data will show in excel type.

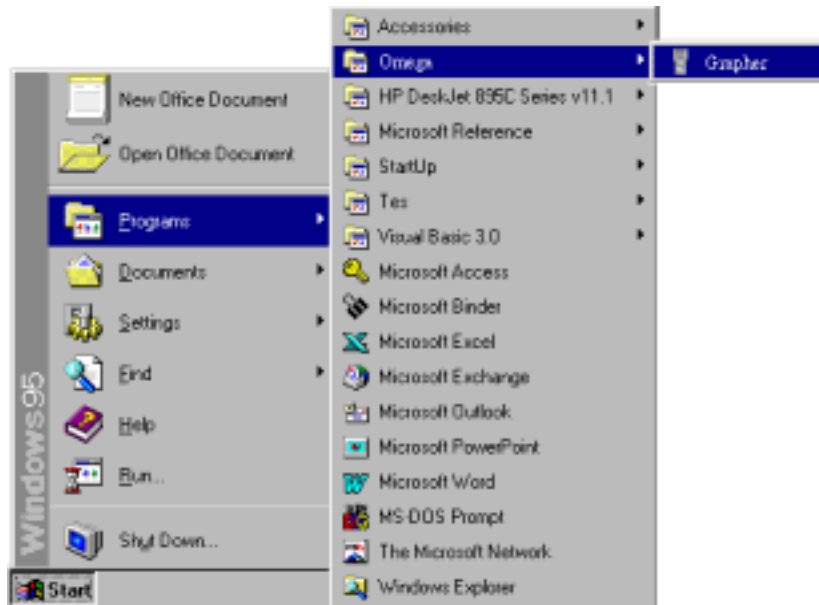


A	B	C	D	E	F	G
1	11/5/99	15:08:49	0	mA	DC	Low
2	11/5/99	15:08:51	0	mA	DC	Low
3	11/5/99	15:08:53	0	mA	DC	Low
4	11/5/99	15:08:55	0	mA	DC	Low
5	11/5/99	15:08:57	0	mA	DC	Low
6	11/5/99	15:08:59	0	mA	DC	Low
7	11/5/99	15:09:01	0	mA	DC	Low

5-6 On-Line Operation with PC

1. Switch off all power related to your PC.
2. Connect the socket (female) of RS-232 cable to PC's COM1 or COM2.
3. Switch on all power.
4. Connect the male socket of RS-232 cable to Graphic Recorder.
5. Run the Grapher software

Click " Start " from Start menu, move mouse pointer to " Programs ", then move pointer to "Omega" (default), move mouse pointer to "GRAPHER" then click.



6. Move mouse to available comport (COM1 , COM2) then click.



7. Main tableau



- ① Time Setup : Move mouse pointer to " System Time Set " then click to input the time of PC to the Graphic Recorder.

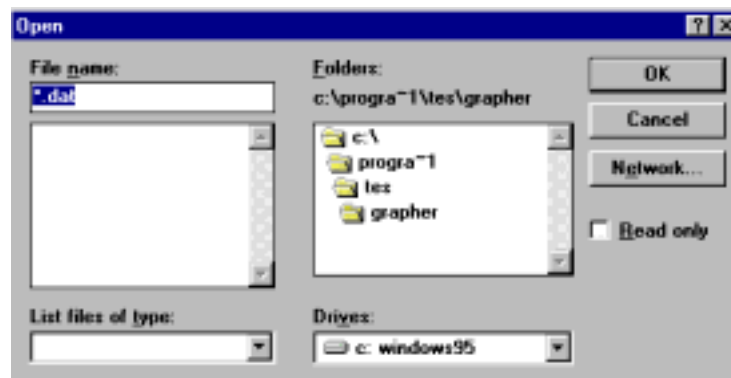
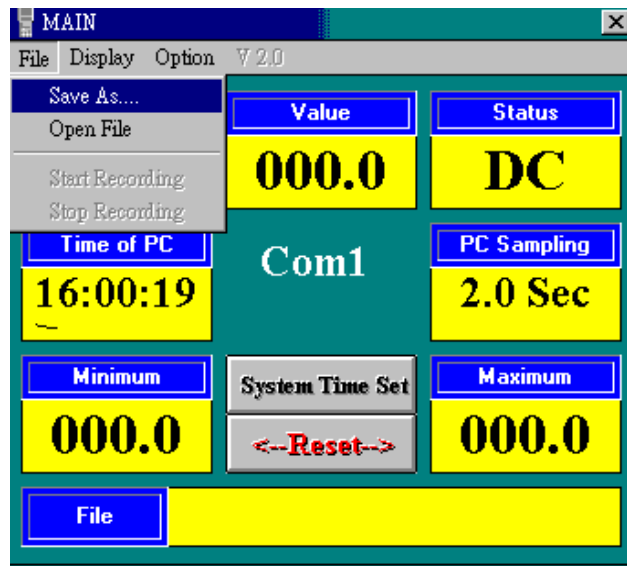


When " WAIT " (in the center of the windows) disappeared, setup of time is completed.

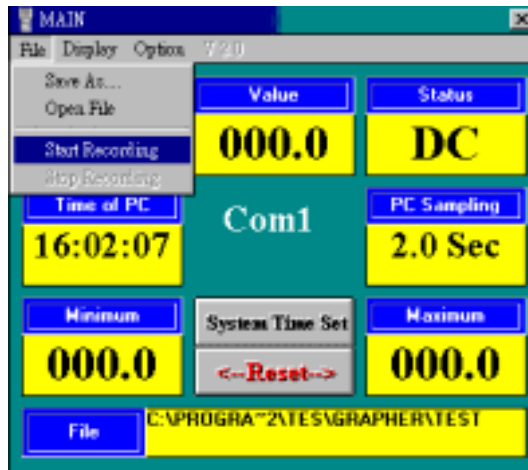
② RESET : Reset current maximum and minimum values. Move mouse pointer to "RESET" then click this button to complete.

③ Save data in HDD :

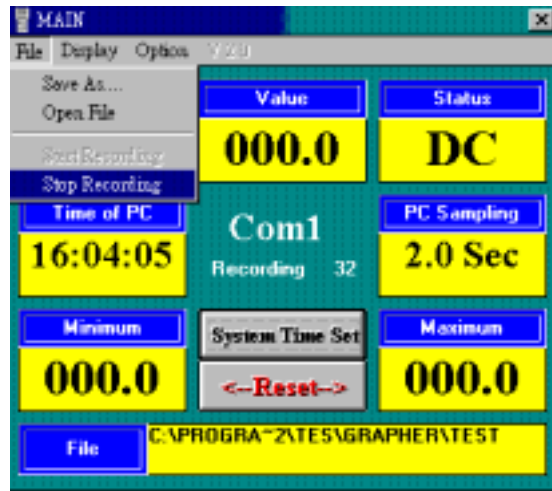
a). Move mouse pointer to "File" then click. And move mouse pointer to "SAVE AS " then click this button. There shows a dialog box to open file. Input a file name then press " OK " .



- b). Move mouse pointer to "File" then click. And move mouse pointer to "Start Recording", then click this button. The "Recording" meanwhile from 1 up to end also will show the Numbers of PC recording.



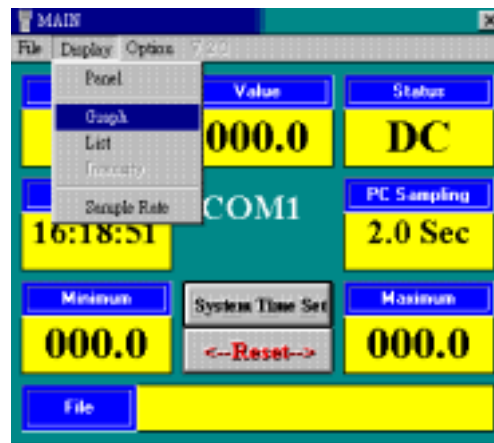
- c). If willing to end this recording, please move mouse pointer to "File" then click. And move mouse pointer to "Stop Recording", then click this button. The "Recording" signal will disappear.

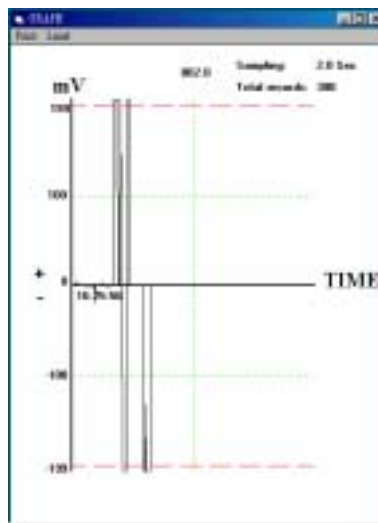


- d). Move mouse point to "File" then click. And move mouse pointer to "OPEN FILE", then click this button. There comes a dialog box to open file. Input the saved file name to read.

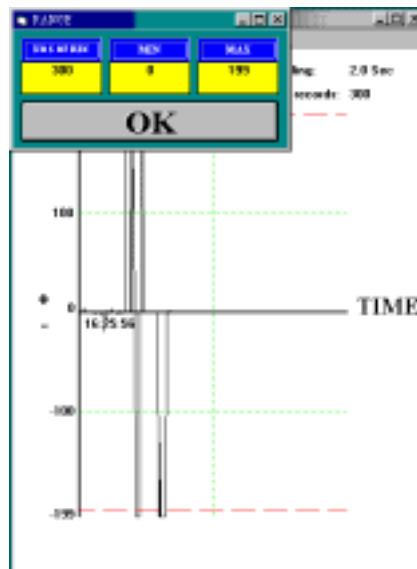


- ④ To show reading values in "GRAPH" type, move mouse pointer to "Display" then click. And move mouse pointer to "GRAPH" then click this button.

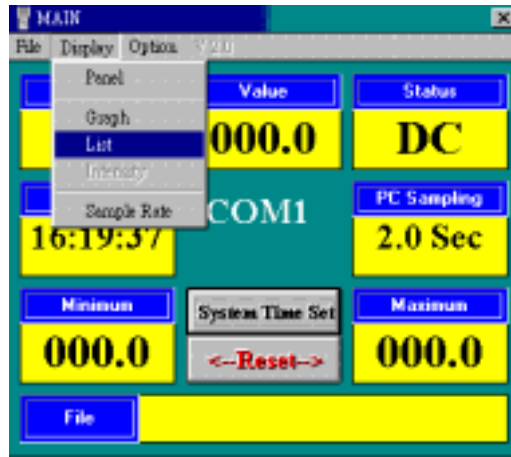




- a). Print : to print graph.
- b). Limit : Move mouse pointer to " Limit ", then click this button. There comes a dialog box. Input the willing setting and then click " OK ". The graph page will show which records on each.



- ⑤ To show reading values in LIST type, move mouse pointer to “Display” then click. And move mouse pointer to “List” and then click this button to launch.



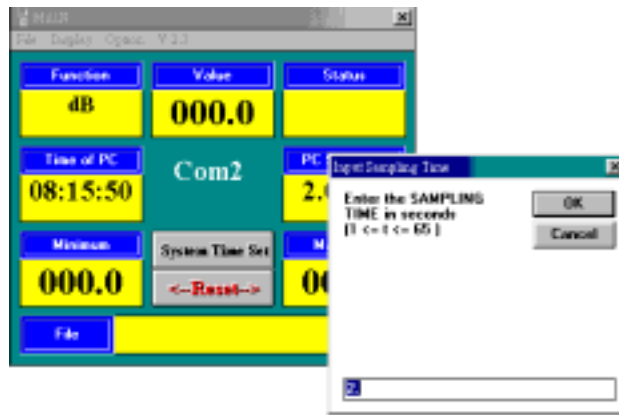
The screenshot shows the 'LIST' window with a menu bar containing 'File'. It displays a table of recorded data points.

	Date	Time	Value	Function	Status	Bat
1	08-30-1999	16:30:59	000.0	mV	DC	Low
2	08-30-1999	16:31:07	000.0	mV	DC	Low
3	08-30-1999	16:31:08	000.0	mV	DC	Low
4	08-30-1999	16:31:10	000.0	mV	DC	Low
5	08-30-1999	16:31:12	000.0	mV	DC	Low
6	08-30-1999	16:31:14	-000.7	mV	DC	Low
7	08-30-1999	16:31:16	-000.8	mV	DC	Low
8	08-30-1999	16:31:18	-002.1	mV	DC	Low
9	08-30-1999	16:31:20	-002.0	mV	DC	Low

- ⑥ PC SAMPLING : (Default : 2 seconds). Change the sampling time of PC. Move mouse pointer to "Display" then click. And move mouse pointer to "Sample Rate" then click this button.



There shows a dialog box "Input Sampling Time". Input the willing seconds the click "OK" to complete this setting.



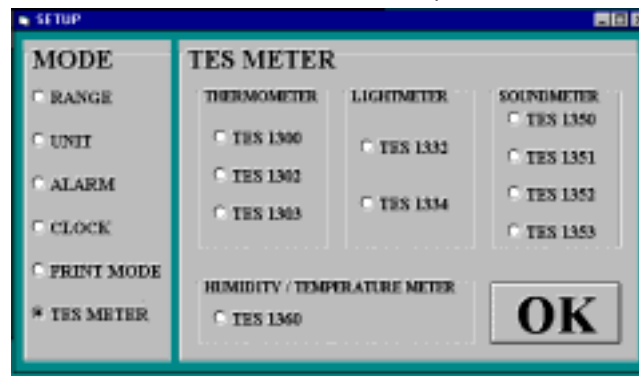
⑦ Operation of connecting with other meters :

A. Tes meters :

- a). Move mouse pointer to "Option" then click. And move mouse pointer to "Setup" then click this button.



- b) In the window "SETUP", move mouse pointer to "TES METER" which is under the title "MODE" then click this option button.



- c). Select an expected meter and then press "OK" to complete.

B. Other meters not in the list :

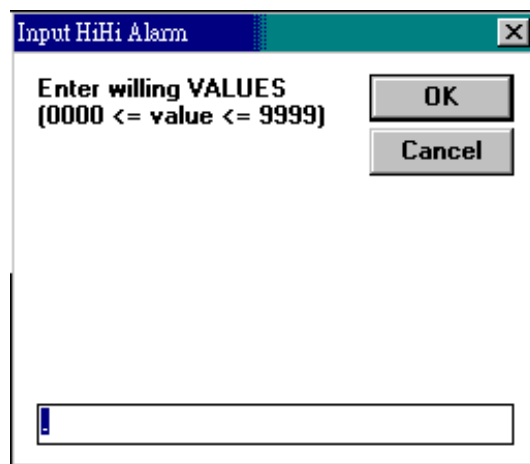
- a). Move mouse pointer to "Option" then click. And move mouse pointer to "Setup" then click this button.
- b). Comply with the output voltage / current of which meters then refer to P.27 (7).
- c). Comply with the unit of which meters then refer to P.28 (8).

⑧ Process Transducer (Od Mode)

- a). Move mouse pointer to " Option " then click. Move mouse pointer to " Od Mode " and then click this button. There shows an " Input HiHi Alarm " dialog box. (as below)



- b). In this dialog box, input the willing values and then press " OK " to complete.



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

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2. Model and serial number of the product, and
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OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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